

Electronics Modeling and Design for Cryogenic and Radiation Hard Applications, Phase II

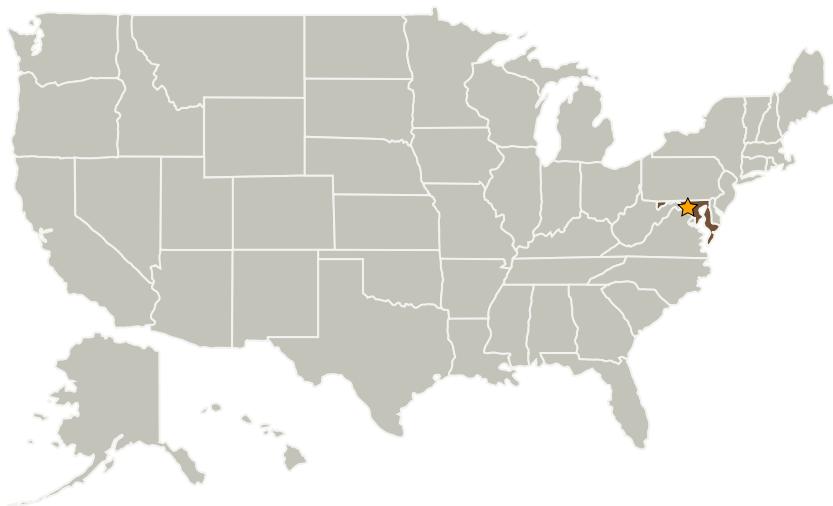
Completed Technology Project (2009 - 2012)



Project Introduction

We are developing CAD tools, models and methodologies for electronics design for circuit operation in extreme environments with a focus on very low temperature and radiation effects. These new tools will help enable NASA to design next generation electronics especially for planetary projects including the Europa Jupiter System Mission. The new models and tools will be directly incorporated into industry standard CAD products to ensure their usability and extend their applicability to extreme environments. Such capabilities will significantly improve reliability, performance and lifetime of electronics that are used for space missions. This will be achieved through the development of novel compact and distributed device modeling capabilities for radiation-hard and extreme temperature instrument design, as well as techniques for circuit design that help to predict the vulnerability of circuits to degradation and upset from radiation. Research and development is indicating that standard bulk silicon CMOS and SOI processes operate well under these extreme conditions so that there is little need for NASA to commit to large expenditures for exotic materials. Models and CAD tools are relatively inexpensive as compared to fabrication costs; thus the results of this project should provide a very large return on investment.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
CoolCAD Electronics, LLC	Supporting Organization	Industry	Takoma Park, Maryland

Primary U.S. Work Locations

Maryland

Project Transitions

**December 2009:** Project Start**June 2012:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.3 Avionics Tools, Models, and Analysis
 - └ TX02.3.2 Space Radiation Analysis and Modeling